

REMARKS

The specification has been amended to correct minor errors. No new matter is believed to be added to the application by this Amendment.

The Application Is Under Non-Final Rejection

On June 19, 2003, a non-final Amendment was filed that presented new claim 7 for the Examiner's consideration. However, The Examiner issued an Office Action on September 9, 2003 that stated on line 4 of the Office Action Summary: "Claim(s) 1-6 is/are pending in the application." New claim 7 was also not recognized or examined on the merits in the body of the Office Action. As a result, the Office Action of September 9, 2003 was non-responsive to the Amendment filed June 19, 2003.

The application is accordingly under non-final rejection.

Status of the Claims

Claims 5-14 are pending in the application. Claims 1-4 are cancelled. The amendment to claim 5 finds support in Figures 1-3. Claims 6 and 7 have been amended to improve their language. Claims 8-11 correspond to cancelled claims 1-4, and claim 8 finds additional support in Figures 1-3. Claims 12-14 find support at page 8, lines 16-22 of the specification.

Rejections Under 35 U.S.C. §102(b)/103(a) Based on Narui

Claims 1-6 are rejected under 35 U.S.C. §102(b) as being anticipated by Narui (*J. Crystal Growth*, 167 (1996), pp. 452-457). Claims 1-4 are rejected under 35 U.S.C. §103(a) as being obvious over the Applicants' disclosure in view of Narui. Applicants traverse.

The Present Invention and its Advantages

The present invention pertains to a method for forming a GaAs/AlGaAs multilayer semiconductor structure over a flat GaAs substrate. The features of the invention include a second layer of higher Al content that is grown on a first layer (of lower Al content) at a slower growth rate than that used to grow the first layer. By employing this method, the present invention advantageously reduces the occurrence of defects including:

- (i) defects which occur over the surface of the substrate when the AlGaAs layer is grown on the flat surface of the GaAs substrate;
- (ii) random projection defects which project at only about 10 nm which occur over the surface of the substrate (and generally have a football-like shape); and
- (iii) defects with regard to forming the interface of the layers parallel to the (100) surface.

The invention finds a typical embodiment in unexamined claim 7, which recites:

7. A method for fabricating a III-V Group compound semiconductor comprising a step of growing on a flat GaAs substrate by epitaxial growth an $\text{Al}_{y_j}\text{Ga}_{1-y_j}\text{As}$ multilayer structure ($0 \leq y_j < 1$, $j = 1, 2, \dots$) including a structure obtained by overlaying on a first layer of lower Al component content a second layer of higher Al component content, in which step the first layer is epitaxially grown first and the second layer is then epitaxially grown on the

first layer at slower epitaxial growth rate than that used to epitaxially grow the first layer.

Distinctions of the Invention Over the Applied Art

Narui pertains to the vapor deposition of AlGaAs on a ridged GaAs(100) substrate for a low threshold current laser. Narui fails to disclose or suggest a technology applicable to planar structures.

Narui produces triangular-shaped double hetero structures such as are shown in Figures 6 and 7 of Narui. Narui, that is, pertains to epitaxial growth on non-planar substrates while the invention pertains to epitaxial growth on planar, i.e., flat, substrates.

In contrast, the invention utilizes a terrace step growth pattern that is discussed at page 6, of the specification, and this terrace step growth pattern relies on normal growth on a flat substrate.

The normal growth (discussed at page 6 of the specification) is performed by forming terraces on a flat substrate. In the case where an uneven condition is intentionally formed on the surface of the substrate, such as in Narui, the growth mode becomes disordered at the stepped portions of the terrace. Accordingly, the normal growth cannot be performed over the surface of the substrate even if the terraces are formed thereon.

As a result, Narui clearly fails to anticipate the present invention.

Further, the technology of Narui is so fundamentally different from that of the present invention that one having ordinary skill in the art would not be motivated by the teachings of Narui to produce a claimed embodiment of the invention.

Yet further, the Examiner turns to the Applicants' own disclosure to help infer obviousness. However, the utilization of the Applicants' own disclosure without an admission of prior art is improper. See Riverwood International Corporation v. R.A. Jones & Co., Inc., 324 F.3d 1346, 66 USPQ2d 1331 (CAFC 2003).

As a result, combining the Applicants' own disclosure with Narui is improper. Even if they could be combined, this combination would still not suffice to allege *prima facie* obviousness. Also, even if obviousness could be alleged, this obviousness would be rebutted by the unexpected results set for the area ratio of abnormalities set forth at page 11 of the specification.

These rejections are accordingly overcome and withdrawal thereof is respectfully requested.

Prior Art

The Examiner is thanked for considering the Information Disclosure Statement filed January 17, 2002, and for making the initialed PTO-1449 form of record in the application in the Office Action mailed December 20, 2002.

The prior art cited but not utilized by the Examiner shows the status of the related art that the invention supercedes. Further remarks are accordingly not necessary.

Foreign Priority

The Examiner has acknowledged foreign priority in the Office Action mailed December 20, 2002.

The Drawings

The drawing figures are found to be acceptable in the PTO-948 form dated May 7, 2002.

Conclusion

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Robert E. Goozner, Ph.D. (Reg. No. 42,593) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), Applicant(s) respectfully petition(s) for a one (1) month extension of time for filing a reply in connection with the present application, and the required fee of \$110.00 is attached hereto.


Amendment of January 9, 2004
Reply to Office Action of September 9, 2003

Appl. No. 10/046,741

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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